

REMARKS/ARGUMENTS

In respond to the objection of Claims 6, 8 and 9, Applicants have amended Claims 6, 8 and 9.

Reconsideration of the application is respectfully requested for the following reasons:

Rejection of Claims 1-3, 8, 10 and 16-18 Under 35 U.S.C. §102(e)

Claims 1-3, 8, 10 and 16-18 are rejected under 35 U.S.C. §102(e) as being anticipated by Wang et al. (U.S. 5,977,626).

Applicants respectfully disagree with the opinions of this rejection. As shown in FIG. 2 of Wang, the package includes a substrate 20. A semiconductor chip or die 22 is fixedly adhered to the substrate 20 by means of die attach material. The substrate has a first major surface and a second major surface. The first major surface is referred to a top side surface of substrate and the second major surface is referred to a bottom side surface of the substrate. The space among the substrate 20, the chip 22 and a heat spreader 32 is encapsulated by molding material (compound) 30 using encapsulating technique. The heat spreader or heat slug 32 is arranged over the top surface (first major surface) of the substrate 20 by using adhesive material 34. The heat spreader is exposed by the molding compound 30. FIGs. 3 and 4 of Wang show similar structures.

It is quite clear that Wang does not teach every element of the claimed invention. Particularly, the heat spreader 32 shown in FIGs. 2, 3 and 4 of Wang only show a single configuration which fail to show the sink of the thermal dissipating element of the claimed invention. The heat

spreader 32 of Wang has a flat surface with an exterior area smaller than that of a trench or a sink. Therefore, the heat spreader 32 of Wang can not achieve the high thermal conductivity of the thermal dissipating element of the claimed invention. It is noted that the term "heat sink" is generally referred to a heat dissipating device for any one with ordinary skill in the art without specifically indicating the structure or configuration thereof. Moreover, the teaching of Wang does not expressly teach a sink which is recited in the description and shown in the figures of the claimed invention. What Wang disclosed is a heat spreader or a heat sink with a flat top surface, not a heat sink with a sink. The disclosure of Wang does not specify the variation of the heat spreader and Examiner actually provides a modification on the teaching of Wang which can only be found in Applicants' disclosure, not in the prior art. The teaching of Wang is insufficient to render the claimed invention unpatentable.

Claims 1 and 9 are rejected under 35 U.S.C. §102(e) as being anticipated by McLellan et al. (U.S. 6,737,755).

Applicants respectfully traverse this rejection. As shown in FIGs. 4A to 4F of McLellan, A singulated semiconductor die 124 is conventionally mounted to an upper surface of the substrate 122 using a die attach epoxy (FIG. 4A). Next, an adapter 132 is mounted to a portion of the top of the semiconductor die 124 for providing a thermal path away from the die 124 (FIG. 4B). The adapter 132 is attached to the die 124. Next, an epoxy material is dispensed on the top surface of the substrate 122, around the semiconductor die 124 forming a liquid dam 148. The package is encapsulated using a glob-top material 150 (FIG. 4D), as would be understood by those skilled in the art. The glob-top encapsulant 150 protects the wire bonds as well as the semiconductor die 124. As shown in FIG. 4D, the glob-top material 150 surrounds a lower portion of the

adapter 132 such that the adapter 132 protrudes from the glob-top encapsulant 150. A heat spreader 134 is then fixed to both the top of the adapter 132 and to the upper surface of the substrate 122 (FIG. 4E). It will now occur to those skilled in the art that the adapter 132 and the heat spreader 134 provide a thermal path away from the die 124 and to the top of the package 120.

Through out FIGs. 4A to 4F of McLellan, the heat spreader 134 of McLellan is almost exact the same with the heat spreader 32 of Wang. McLellan only show a single configuration which fail to show the sink of the thermal dissipating element of the claimed invention. The heat spreader 134 of McLellan has a flat surface with an exterior area much smaller than that of a trench or a sink. Therefore, the heat spreader 134 of McLellan can not achieve the high thermal conductivity of the thermal dissipating element of the claimed invention. It is noted that the term "heat sink" is a generic term generally referred to a heat dissipating device for any one with ordinary skill in the art without specifically indicating the structure or configuration thereof. The term "heat sink" can not be treated as a heat dissipating device with a sink. Moreover, the teaching of McLellan never discloses a sink which is specifically recited in the description and shown in the figures of the claimed invention. What McLellan disclosed is a heat spreader or a heat sink with a flat top surface, not a heat sink with a sink. The disclosure of McLellan dose not specify the variation of the heat spreader. Examiner actually provides a modification or suggestion on the teaching of McLellan which can only be found in Applicants' disclosure, not in the prior arts including the disclosures of Wang and McLellan. It is therefore that the teaching of McLellan is also insufficient to render the claimed invention unpatentable.

Rejection of Claims 4-7, 11-12, 13-15 and 19-20 Under 35 U.S.C. §103(a)

Claims 4-7, 13-15 and 19-20 are rejected under 35 U.S.C. §103(a) as being unpatentable over Wang in view of Combs (U.S. 2004/0046241). Moreover, Claims 11 and 12 are rejected under 35 U.S.C. §103(a) as being unpatentable over Wang in view of Tang (U.S. 6,246,115).

Applicant respectfully traverses these rejections. The adaptor 120 of Combs and the holes 321a of Tang only show the limitations of the defendant claims of the claimed invention and the heat sink 110 of Combs as well as the heat sink 32 of Tang still keep silence about the feature which Wang and McLellan fail to disclose. Furthermore, the heat sink 110 of Combs and the heat sink 32 of Tang are two best examples which show the term "heat sink" can not be treated as a heat dissipating device with a sink. The teachings of Wang, McLellan, Combs and Tang never discloses a sink which is specifically recited in the description and shown in the figures of the claimed invention. What Wang, McLellan, Combs and Tang disclosed are heat spreaders or a heat sinks each with a flat top surface, not heat sinks each with a sink. Examiner actually provides a modification or suggestion on the teaching of Wang, McLellan, Combs and Tang which can only be found in Applicants' disclosure, not in the prior arts including the disclosures of Wang, McLellan, Combs and Tang. It is therefore that the teaching of Wang, McLellan, Combs and Tang are insufficient to render the claimed invention unpatentable.

Conclusion

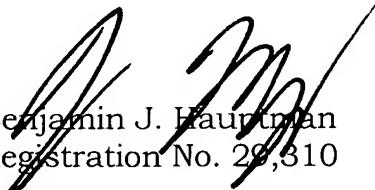
In light of the above remarks to the claims, Applicants contend that claimed invention is patentable thereover. Claims 1-20 are now in

condition for favorable consideration and allowance of Claims 1-20 are most respectfully requested.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,

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